University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Genomic Technologies					
Module Code	USSKBF-30-3		Level	3	Version	1
Owning Faculty	Health and Applied Sciences		Field	BBAS		
Contributes towards	BSc (Hons) Biological Science BSc (Hons) Biomedical Sciences (Clinical) Block Release Route BSc (Hons) Biomedical Sciences (including Clinical) BSc (Hons) Forensic Science BSc (Hons) Healthcare Science (Life Sciences)					
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard	
Pre-requisites	One of the following; USSKAL-30-2 Molecular Biology USSKAM-30-2 Genes & Biotechnology USSKB7-15-2 Molecular Genetics		Co- requisites			
Excluded Combinations	None		Module Entry requirements	N/A		
Valid From	September 2014		Valid to	September 2020		

CAP Approval Date	28/03/2014

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to: • Describe and critically discuss past, current and future developments in DNA sequencing technologies (assessed in Component A); • Review and discuss the scope of bioinformatics including alignment techniques and databases. Select and use appropriate bioinformatic 'tools' (assessed in Component A & B); • Discuss the concept of 'model' genomes and their importance. Describe and critically assess the techniques used to analysis model genomes and the discoveries that have been made using them (assessed in Component A);

	• Discuss and critically assess the methods of global expression analysis including the transcriptome and the proteome and the applications of these technologies (assessed in Component A & B); • Review, discus and evaluate a range of current uses for genomic technologies (assessed in Component A)
Syllabus Outline	**Genome technologies** • DNA sequencing Structure of a genome, Sanger sequencing, next generation sequencing, future sequencing technologies. • Bioinfomatics Analysis Techniques - DNA Gene annotation, DNA and protein databases, SRS. Pairwise alignment techniques; BLAST, identity & similarity. Multiple sequence alignment; PSI-BLAST, Clustal. • Bioinformatics Analysis Techniques – Protein Secondary databases & protein structure predication; motifs, pattern and profile database, PROSITE, structure databases, Domains, ExPASy Proteomics tools. Structural Proteomics, methods of determination, how to display and store. • Model Genomes Structure & organisation, techniques used to study model genome, discoveries made. • Analysis of Gene Expression & Function Expression analysis, microarrays, SAGE, RNAseq, functional assays, 'knock-out' & 'knock-down' technologies, proteomics. **Applications of genome technologies** Current topics for example; • Drug development and targets – Analysis of drug resistance. • Identification of tumour-rejection antigens. • Genome Analysis in Forensic Science. • Reconstructing Phylogenies. • Antibiotic drug discovery & reverse vaccinology.
Contact Hours	The contact hours (72) are distributed as follows: • 66 hours lectures • 6 hours computer tutorials
Teaching and Learning Methods	The module will be delivered as mix of lectures and data analysis tutorials. **Scheduled learning** • Scheduled contact time is structured around a series of lectures that introduce the key concepts of the topic under discussion. • Bioinformatics lectures will be supported by a serious of computer based tutorials to allow the students to put the theory in to practice and prepare for their assignment. • Revision will be embedded in the lectures but also focused on in an additional tutorial session. **Independent learning** includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.
Key Information Sets Information	Key Information Sets (KIS) are produced at programme level for all programmes that this module contributes to, which is a requirement set by HESA/HEFCE. KIS are comparable sets of standardised information about undergraduate courses allowing prospective students to compare and contrast between programmes they are interested in applying for.

Key Information Set - Module data

Number of credits for this module	30

Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Placement study hours	Allocated Hours
300	72	228	0	300

The table below indicates as a percentage the total assessment of the module which constitutes a -

Written Exam: Unseen written exam

Coursework: Written assignment, data analysis

Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description:

Total assessment of the module:	
Written exam assessment percentage	60%
Coursework assessment percentage	40%
	100%

Reading Strategy

All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively.

This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders.

Indicative Reading List

The following list is offered to provide validation panels/accrediting bodies with an indication of the type and level of information students may be expected to consult. As such, its currency may wane during the life span of the module specification. However, as indicated above, CURRENT advice on readings will be available via other more frequently updated mechanisms.

Books: The most recent edition of

Primrose SB & Twyman RM. Principles of Genome Analysis & Genomics. Blackwell.

Brown TA. Genomes. Bios.

Lesk AM. Introduction to Genomics. Oxford University press.

Lesk AM. Introduction to bioinformatics. Oxford University press.

	Westhead DR, Parish JH & Twyman. Instant Notes; Bioinformatics. Bios. Russell PJ. iGenetics – A Molecular Approach. Pearson Education. Brown TA. Gene Cloning and DNA Analysis. Blackwell Science. Dale JW & vonSchantz M. From Genes to Genomes. Wiley. Journals: Trends in Genetics Nature Genetics Nature Reviews PLoS PNAS

Part 3: Assessment	
Assessment Strategy	The Assessment for this module is designed to test the breadth and depth of students' knowledge, as well as their ability to analyse, synthesize and summarise information critically, including published research. The controlled component is a written exam. The exam will be 3 hours duration which is consistent with the Department's assessment strategy for Level 3 modules. This assessment allows students to demonstrate both their ability to research, prioritise information and produced a structured, evidence based answer. This assessment links directly to requests from employers as they require graduates proficient at researching and scientific writing under pressure. The examination provides students with the opportunity to demonstrate their knowledge and understanding of the key concepts and paradigms associated with the subject matter, to use case studies and other evidence critically to support their arguments. The case study provides the opportunity for the student to complete an in-depth analysis of selected topic from the module syllabus by critically reviewing published research. The second assignment will be a problem based data interpretation that allows the students to select and use appropriate bioinformatics techniques and interpreter the out puts of their analysis. Opportunities for formative assessment and feedback are built into the assignments and review of past exam papers. All work is marked in line with the Department's Generic Assessment Criteria and conforms with the university policies for the setting, collection, marking and return of student work. Assessments are described in the Module handbook that is supplied at the start of module.

Identify final assessment component and element			
% weighting between components A and B (Standard modules only)		**A:** **60%**	**B**: **40%**
First Sit			
Component A (controlled conditions) **Description of each element**		**Element weighting**	

1. Exam (3 hours)	100%
Component B **Description of each element**	**Element weighting**
1. Case study	50%
2. Data interpretation	50%

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting**
1. Exam (3 hours)	100%
Component B **Description of each element**	**Element weighting**
1. Case study	50%
2. Data interpretation	50%
If a student is permitted an **EXCEPTIONAL RETAKE** of the module the assessment will be that indicated by the Module Description at the time that retake commences.	